(No Model.) 2 Sheets—Sheet 1.

J. R. GODSHALL.

WINDMILL.

No. 441,153. Patented Nov. 25, 1890.

Fig. 1.

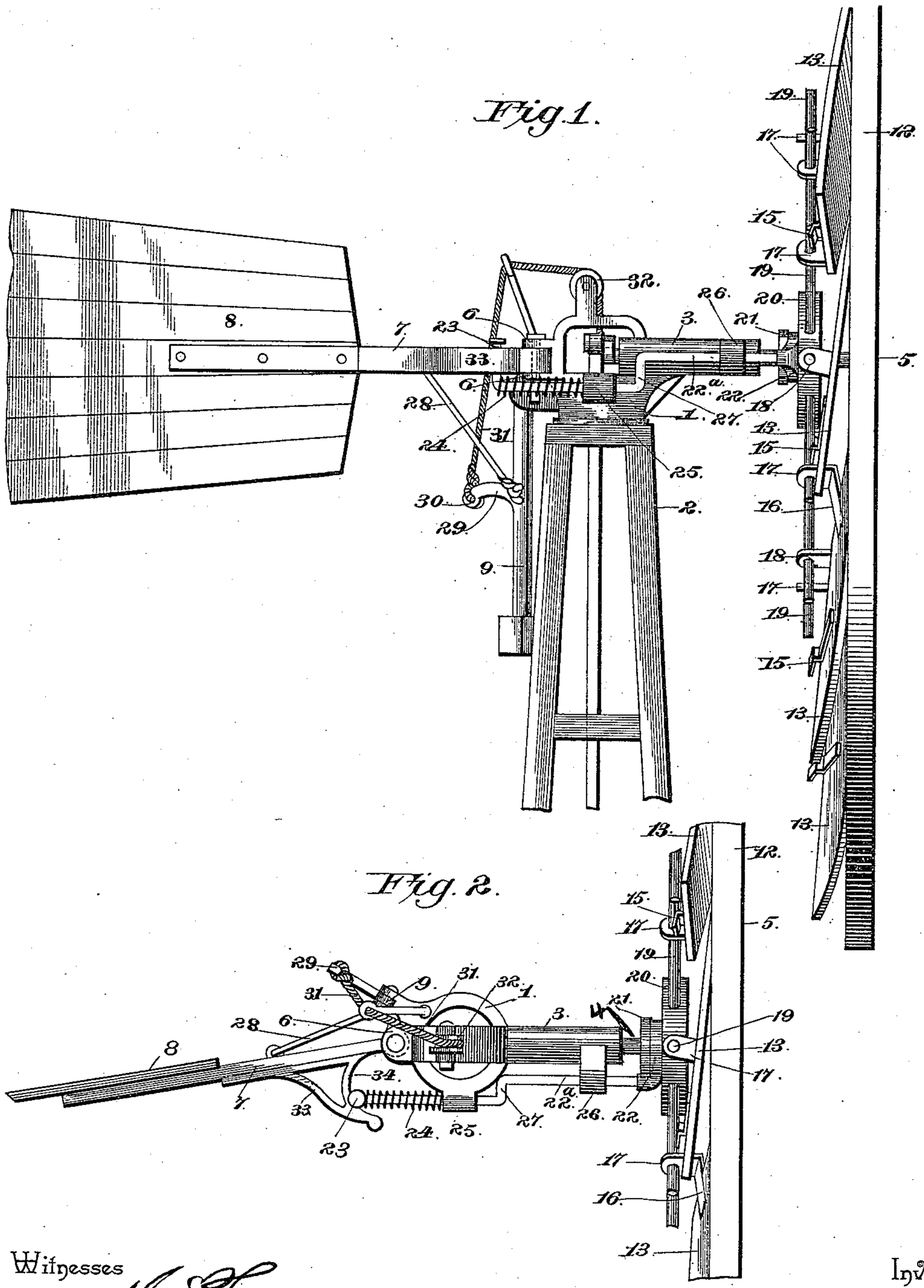

Fig. 2.

Witnesses

M. E. Fowler

H. C. Riley

By his Attorneys,

Church & Co.

Inventor

Joseph R. Godshall

(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

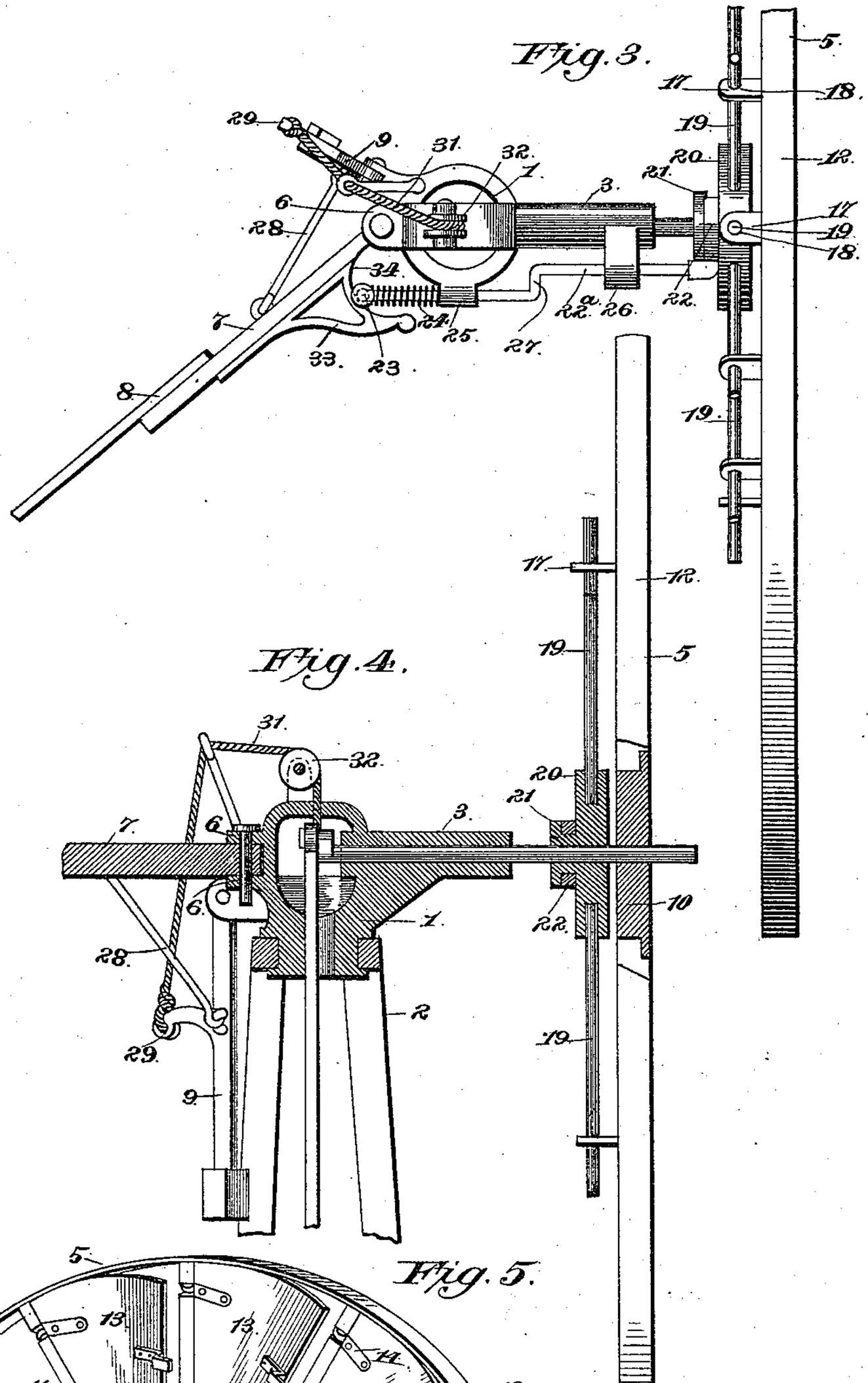

Fig. 4.

Fig. 5.

Witnesses

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UNITED STATES PATENT OFFICE.

JOSEPH R. GODSHALL, OF BLOOMING GLEN, PENNSYLVANIA.

WINDMILL.

SPECIFICATION forming part of Letters Patent No. 441,153, dated November 25, 1890.

Application filed March 31, 1890. Serial No. 346,044. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH R. GODSHALL, a citizen of the United States, residing at Blooming Glen, in the county of Bucks and State of Pennsylvania, have invented a new and useful Windmill, of which the following is a specification.

The invention relates to improvements in windmills.

The object of the present invention is to simplify and improve the construction of that class of windmills in which the blades are hinged or pivoted in the wheel and enable the wheel to automatically adjust itself and rotate with regularity, and render it capable of withstanding the force of heavy storms without liability of its becoming injured.

The invention consists in the construction and novel combination and arrangement of parts hereinafter fully described, illustrated in the accompanying drawings, and particularly pointed out in the claims.

In the drawings, Figure 1 is a side elevation of a windmill constructed in accordance with this invention, the hinged blades being partially open. Fig. 2 is a plan view, the parts being in position illustrated in Fig. 1. Fig. 3 is a similar view showing the blades closed. Fig. 4 is a vertical sectional view, the wheel being shown in elevation. Fig. 5 is a detail perspective view of a portion of the wheel.

Referring to the accompanying drawings, 1 designates a turn-table, which is mounted upon a tower 2, and is provided upon one side with bearings 3, in which is journaled a shaft 4, upon the outer end of which is mounted a wind-wheel 5. The turn-table 1 is provided with a pair of ears 6, which are arranged diametrically opposite the bearings 3, and have pivoted between them the arm 7 of a vane 8, that is adapted to move laterally to throw the wind-wheel 5 into and out of the wind, and is controlled by a weighted lever 9.

The wind-wheel 5 consists of a hub 10, radial spokes 11, having their inner ends secured in suitable sockets and their outer ends connected by a ring or rim 12, and blades 13, hinged to the spokes and adapted to fold within the interval between the spokes and lie flush with the faces of the latter and present no resistance to the wind and enable the wheel to withstand heavy storms without liability of becoming injured, and the said blades may be swung on the spokes 11 and open to catch the wind to rotate the wheel. The blades are similarly connected to the spokes by the hinges 14, and are provided upon their opposite sides with stops 15, that engage the adjacent spoke and prevent the blade passing through the interval and swinging upon the opposite side of the wheel and hold the blade in alignment with the spokes, and the said blades are provided at their inner ends with brackets 16, having L-shaped plates projecting inward toward the hub.

The arm 17 of the bracket 16 extends laterally from the blade and is provided with an opening 18 to receive a rod 19, extending radially from a disk 20, that slides upon the shaft 4 in the space between the wind-wheel and the bearings 3, and is provided with a series of the rods 19, that engage the blades 13, and when the disk is drawn toward the bearings 3 the blades are swung open and arranged to be engaged by the wind to rotate the wheel. The disk is provided with an integral flanged sleeve 21, that is engaged by a forked plate 22, secured to one end of an operating-rod 22^a, that has its other end bent laterally and engaged by a spring 24, that normally holds the blades of the wheel open, and is arranged to be compressed by the vane 8, to close the blades when the wind increases in force. The operating-rod is mounted in bearings 25 and 26, and is provided with a bend 27, that engages the bearing 25 and prevents the blades opening too far; and it will be seen that the spring 24, which is arranged upon the operating-rod between the bent end 23 and the bearing 25, holds the blade open when there is no wind independent of the action of the vane and the weighted lever, and the said blades are capable of independent adjustment and regulate themselves to the force of the wind, and thereby produce easy and smooth operation of the machine and prevent the stiffness ordinarily incident to engines in which the wheels are controlled solely by an adjustable weight. The vane is connected with the weighted lever 9 by a link-rod 28, and the weighted lever is provided at a point intermediate of its ends with an integral arm 29, arranged at an angle to the lever, and provided with an open-

ing 30, in which is secured a rope 31, that passes over a pulley 32, and is arranged within the tower and enables the weighted lever and the vane to be adjusted. The arm 7 of the vane is provided with a projecting plate or bracket 33, having a curved end 34, that is arranged to engage the operating-rod 22, and compress the spring and close the hinged blade when the vane is swung laterally by the increased force of the wind against the action of the weighted lever, and when the wind subsides the weight will draw the vane to its normal position in alignment with the shaft 4, and the spring will open the hinged blades.

From the foregoing it will readily be seen that the windmill is simple and comparatively inexpensive in construction, and that the blades are capable of adjustment independent of the vane and the weighted lever, and are capable of automatically adjusting themselves to the force of the wind and insure ease and regularity in the regulation of the windmill. It will further be seen that the hinged blades are adapted to be closed into the intervals between the spokes and lie flush with their side faces and present no obstruction to the wind, and thereby enable the wheels to withstand heavy storms without liability of becoming injured.

The blade by being hinged at one side to the spoke only meets with resistance offered by the wind upon one side of the wheel, and this resistance tends to close the blade, and as the wind increases in violence the resistance encountered by the blades increases and partially closes the blades and diminishes the rapidity of the wheel, which is thus rendered independently and automatically adjustable, and is little affected by variations in the force of the wind.

What I claim is—

1. In a windmill, the combination of the turn-table, the shaft journaled thereon, the wind-wheel provided with blades having one of their sides hinged to a spoke, the disk sliding upon the shaft and provided with radial rods engaging the blades, and the spring-actuated operating-rod adapted to hold the blades open independent of the action of the vane, substantially as described.

2. In a windmill, the combination of the turn-table, the shaft journaled thereon, the wind-wheel provided with blades hinged to the spokes, the disk sliding upon the shaft and provided with radial rods engaging the blades, the spring-actuated operating-rod connected with the disk and holding the blades normally open, and the vane provided with the curved projection engaging the operating-rod, substantially as and for the purpose described.

3. In a windmill, the combination of the turn-table provided with the bearings 3, 25, and 26, the shaft mounted in the bearing 3, the wind-wheel provided with blades hinged to the spoke, the disk provided with radial rods engaging the hinged blades and having the flanged sleeve 21, the operating-rod mounted in the bearings 25 and 26 and having one end connected to the sleeve and the other end 23 bent laterally and provided intermediate of its end with the bend 27, arranged to engage the bearing 26, and the spring 24, interposed between the bearing 26 and the end 23 and holding the blades normally open, substantially as described.

4. In a windmill, the combination of the turn-table, the shaft mounted thereon, the wind-wheel provided with hinged blades, the disk sliding upon the shaft and having radial rods engaging the blades, the spring-actuated operating-rod connected to the disk and holding the blades normally open, the vane hinged to the turn-table and provided with a curved projection arranged to engage the spring-actuated operating-rod, the weighted lever, and the link-rod connecting the weighted lever and the vane, substantially as described.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of two witnesses.

JOSEPH R. GODSHALL.

Witnesses:
O. H. NARE,
C. M. HARTZELL.